RIDER PROPELLED VEHICLE

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a vehicle that can be used for transportation or recreation. The rider can choose to propel the vehicle by either manipulating the steering mechanism back and forth to "walk" the vehicle forward or backward across the ground or when holding the steering mechanism in a straight direction, propel it with one foot upon the vehicle and one pushing off of the ground in a conventional manner. The vehicle offers all of the mobility of a two-wheeled, un-motorized scooter or skateboard but with the added stability and safety of five wheels. The vehicle is capable of many incarnations including a steerable skateboard, a steerable snowboard and a steerable sidewalk ski-board.

Description of the Related Art

Recently two-wheeled, un-motorized, rider propelled scooters have become very popular with people of all ages. The high maneuverability and low profile of the scooter makes it fun to ride. However, these same features make these scooters unstable when used by a standing rider. When a standing rider looses her balance or control of the scooter a tipping instability is introduced. This instability can make the scooter dangerous and difficult to use for the casual or inexperienced rider. Using the steering

mechanism to turn the board as in the instant invention allows the rider to remain in a more upright and in control position in relation to the board. The instant invention is therefore more stable than a scooter. The vehicle offers all of the mobility of a two-wheeled, un-motorized scooter but with the added stability and safety of five wheels. A seated or standing rider can use the instant invention in contrast to a two-wheeled scooter that accommodates only standing riders. The instant invention can be steered using a hand only or a foot only steering mechanism. A vehicle with more than two wheels and tipping limiting devices would preserve the high maneuverability desired in this type of device and also greatly reduce the associated tipping instability. A two-wheeled scooter lacks the rider propulsion system of the instant invention. The rider propulsion system allows a rider to "walk" the vehicle across the ground without the rider resorting to using a foot to push off of the ground in a typical scooter propulsion manner. A rider can "walk" the vehicle forward or backward. The instant invention also allows the rider to propel the vehicle by using a foot to push off of the ground in a typical scooter propulsion manner.

The traditional skateboard has been popular for many years. Although it typically has four wheels, each side-by-side wheel pair is mounted upon a swivel device with a single swivel point. This arrangement has the effect of balancing the board upon only two support points, a very unsteady arrangement. Similarly, skateboards also possess a high degree of tipping instability and require a very high degree of skill to safely and enjoyably ride them. A vehicle with more than two support points and tipping limiting devices would preserve the high maneuverability desired in this type of device and also greatly reduce the associated tipping instability. The vehicle offers all of the mobility of a

skateboard but with the added stability and safety of five wheels. The skateboard lacks the rider propulsion system of the instant invention in which a rider can "walk" the vehicle across the ground and a rider can propel the vehicle by using a foot to push off of the ground in a typical skateboard propulsion manner. A rider can "walk" the vehicle forward or backward. The entire skateboard must be tilted and turned for the rider to effect a directional change, whereas the rider of the instant invention can make a turn by turning the steering device. Using the steering mechanism to turn the board as in the instant invention allows the rider to remain in a more upright and in control position in relation to the board. The instant invention is therefore more stable than a skateboard. A seated or a standing rider can use the instant invention in contrast to a skateboard that accommodates only standing riders. The instant invention can be steered using a foot steering mechanism. The instant invention becomes a steerable sidewalk ski board when fitted with its two snowboard type bindings and propelled by pushing off the ground with rubber tipped ski poles in a typical snowboard propulsion manner.

The snowboard has also developed a high degree of popularity over the last several years. Although snowboards slide directly upon the snow and do not ride on wheels, they also require a high degree of rider skill to ride safely and enjoyably. The low friction connection between the board and the snow that makes the snowboard highly maneuverable also gives it a tipping instability. The entire snowboard must be turned for the rider to effect a directional change whereas the rider of the instant invention can make a turn by turning the steering device. The method of turning the snowboard changes the rider's center of gravity in relation to the snowboard reducing the rider's stability. Using the steering mechanism to turn the board as in the instant invention allows the rider to

remain in a more upright and in control position in relation to the board. The instant invention is therefore more stable than a snowboard. A seated or a standing rider can use the instant invention in invention in contrast to a typical snowboard that accommodates only standing riders. The instant invention can be steered using a foot steering mechanism. A snowboard lacks the rider propulsion system of the instant invention. A rider can "walk" the vehicle across the snow or a rider can propel the board by pushing off the ground with ski poles in a typical snowboard propulsion manner. A rider can "walk" the vehicle forward or backward.

One objective of this invention is to create a stable and relatively safe vehicle that a casual rider can use. A second objective is to create a vehicle with enough adaptability that a seated rider or a standing rider can enjoy it. A third objective is to create a vehicle that can be used on rougher terrain than a conventional scooter. A fourth objective is to devise a vehicle that can be self-propelled using either hand or a foot-powered mechanism. A fifth objective is to devise a vehicle that can be adapted into many forms to suit many rider tastes and different terrain types. A final objective is to devise a vehicle that can be produced at a relatively low cost.

SUMMARY OF THE INVENTION

The invention is a rider-propelled wheeled vehicle called a twist scooter. The twist scooter includes a frame. The frame has a first end, a second end, a first side, a second side, an upper surface, a lower surface and a vertical centerline plane running lengthwise.

A pair of wheel supports is provided. Both of the wheel supports are attached to and supporting the second end of the frame. A wheel is mounted onto a horizontal axle attached to each individual wheel support. Each wheel support is spaced at equal distances on opposite sides of the centerline plane of the frame.

A safety bumper means is provided. The safety bumper means is attached to the lower surface of the second end of the frame, aft of the wheel supports. The safety bumper means is located such that the centerline plane of the frame bisects it. The safety bumper means is sized and shaped to prevent excessive backward tipping of the vehicle on the wheels attached to the wheel supports, but also allow a full range of horizontal movement. The safety bumper means is capable of functioning as a braking device. A braking force is created when the vehicle is intentionally tipped backwards to bring the safety bumper means into frictional contact with the ground.

A vertical steering shaft is provided. The vertical steering shaft has a first end, a second end, and a vertical centerline axis. The vertical steering shaft is rotatably connected through the first end of the frame. The rotatable connection permits a 360-degree swivel of the vertical steering shaft. The vertical steering shaft is vertically disposed. The centerline axis of the vertical steering shaft lies within the centerline plane of the frame.

A tricycle propulsion means is provided. The tricycle propulsion means possesses a propulsion wheel disposed at each of the two corners and a safety wheel assembly disposed at the third corner of the tricycle wheel arrangement. The two propulsion wheels and the safety wheel assembly are attached to the vertical steering shaft by a horizontal support. Each propulsion wheel is parallel to the other propulsion wheel. Both

propulsion wheels rotate about a horizontally disposed axle. The horizontally disposed axle is connected to the horizontal support. The safety wheel assembly is sized, shaped and disposed so that it only comes into contact with the ground when the tricycle propulsion means excessively tips over on both the propulsion wheels. The tricycle propulsion means and vertical steering shaft combination supports the first end of the frame. The pair of propulsion wheels is spaced at equal distances on opposite sides of vertical steering shaft. The propulsion wheels rotate in only one direction about its horizontal axle. Both propulsion wheels rotate only in the same direction about their respective horizontal axle.

A rider operable steering means is provided. The rider operable steering means is attached to the second end of the vertical steering shaft. A standing or sitting rider is able to propel and steer the vehicle using only hand-applied force to the rider operable steering means. The hand applied force results in rotation of the vertical steering shaft.

The tricycle propulsion means is adapted to occupy a first neutral position in which the vertical plane of each propulsion wheel is generally parallel to the centerline plane of the frame. The first neutral position permits forward propulsion of the vehicle in a direction parallel to the centerline plane of the frame.

The rider operable steering means is employed by the rider to rotate the tricycle propulsion means. When the tricycle propulsion means is rotated, a reversing force is exerted upon one of the propulsion wheels resulting in the tricycle propulsion means pivoting about the point of contact of the propulsion wheel with the ground. The pivoting of the tricycle propulsion means induces a forward motivating force to be applied to the other propulsion wheel. The motivated propulsion wheel rotates forward until the rider

reverses the rotation of the tricycle propulsion means about the vertical steering shaft axis or the vertical plane of the propulsion wheel is perpendicular to the centerline plane of the frame. A reverse direction rotation about the vertical steering shaft reverses the direction of the force applied to each propulsion wheel but still results in forward propulsion of the vehicle. The back and forth rotation about the vertical centerline axis of the vertical steering shaft propels the vehicle forward. The safety wheel assembly imparts no propulsion force into the vehicle during the back and forth rotation about the vertical centerline axis of the vertical steering shaft that propels the vehicle forward. This back and forth manipulation of the steering mechanism results in "walking" propulsion of the vehicle.

The tricycle propulsion means is tailored to occupy second neutral position 180 degrees opposite the first neutral position. When in the second neutral position, the vertical plane of each propulsion wheel is generally parallel to the centerline plane of the frame. The second neutral position permits backward propulsion of the vehicle in a direction parallel to the centerline plane of the frame. The back and forth rotation of the tricycle propulsion means about the vertical steering shaft of up to plus or minus 90 degrees from the second neutral position imparts a generally backward propulsion of the vehicle through a process that is the reverse of the forward propulsion process.

A second version of the invention, a wheel in contact with the ground only when the tricycle propulsion means excessively tips over on both the propulsion wheels, is rotationally connected to the safety wheel assembly. The safety wheel assembly possesses a means for permitting rotation of the wheel about a vertical axis. The safety

wheel assembly possesses a means for permitting rotation of the wheel about a horizontal axle.

In a third version of the invention, a removable upper vertical steering shaft support means is provided. The removable upper vertical steering shaft support means possesses a first end and a second end. The first end is able to detachably connect to the upper surface of the first end of the frame. The second end is rotationally attached to the vertical steering shaft.

In a fourth version of the invention, the tricycle propulsion means is detachably connected to the vertical steering shaft.

In a fifth version of the invention, the vertical steering shaft possesses a vertical telescoping extension capability that changes the distance between the first end and the second end of the vertical steering shaft. The vertical steering shaft is composed an outside shaft with a first end, a second end, an outer surface, and a hollow interior and a plurality of concentrically ensleeved inside shafts, each capable of being ensleeved by its corresponding outside shaft to make the vertical steering shaft telescopic. A locking means is affixed to the second end of each outside shaft and provides a locking means against each corresponding ensleeved inside shaft. Each inside shaft is capable of being locked into a user determined telescopic extension length.

In a sixth version of the invention, the second end of the frame accommodates a standing or seated rider.

In a seventh version of the invention, a removable seat extension is provided. The removable seat extension possesses a first end and a second end. The first end is shaped to slideably attach to a receiver means located on the upper surface of the second end of

the frame. The second end of the removable seat extension is shaped to comfortably accommodate a seated rider.

In an eighth version of the invention, the rider operable steering means permits the rider to steer or propel the vehicle using the rider's feet. The rider operable steering means is adapted so that a sitting rider is able to propel and steer the vehicle using only foot-applied force to the rider operable steering means. The foot applied force results in rotation of the vertical steering shaft.

In a ninth version of the invention, a pair of foot stirrups is connected to the rider operable steering means. A foot stirrup is connected on opposite sides of the rider operable steering means.

In a tenth version of the invention, a pair of removable cantilevered foot pedals is connected on opposite sides of the vertical steering shaft. A rider's foot force is applied to each removable cantilevered foot pedal to impart a back and forth rotation about the vertical centerline axis of the vertical steering shaft required to propel the vehicle forward.

In an eleventh version of the invention, a foot steering means is provided. The vertical steering shaft has a separation joint located above the rotatable connection through the first end of the frame. . The foot steering means is attached to the remaining portion of the vertical steering shaft when the separation joint is disconnected, and the portion the vertical steering shaft above the separation joint is removed. The foot steering means attaches to the rider's footwear through the use of snowboard type bindings. A standing rider's foot through a slight back and forth rotation about the vertical centerline axis of the vertical steering shaft imparts steering changes.

In a twelfth version of the invention, an aft foot holder is provided. The aft foot holder is attached to the upper surface of the frame near its second end. The aft foot holder attaches to the rider's footwear through the use of snowboard type bindings. The rider pushes along with rubber tipped ski poles to generate vehicle propulsion.

In a thirteenth version of the invention, the pair of fixed wheel supports is removed from the frame. A steering ski attached to the first end of the vertical steering shaft replaces the tricycle propulsion means. The safety bumper means is also removed from the frame. These changes transform the vehicle into a steerable snowboard capable of use on snow. Typical ski poles are used for added rider control.

The twist scooter's five-wheel layout creates a stable and relatively safe vehicle for a casual rider to use. The twist scooter is adaptable enough that a seated rider or a standing rider can enjoy it. The twist scooter can be safely used on rougher terrain than a conventional scooter. The twist scooter can be self-propelled using either hand or a foot-powered mechanism. The twist scooter is a vehicle that can be adapted into many forms to suit many rider tastes and different types of terrain. The twist scooter can also be produced and sold for a relatively low cost.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view canted around a horizontal forward to aft axis to show the upper surface of the frame;

Figure 2 is a side view of the forward end of the vehicle canted around a horizontal forward to aft axis to show the connection of the tricycle propulsion means to the vertical steering shaft;

Figure 3 is a side view of the aft end of the vehicle canted about a vertical axis to show the pair of wheel supports and safety bumper means;

Figure 4 is a trimetric view of the pair of foot stirrups connected on opposite sides of said rider operable steering means;

Figure 5 is a side view canted around a horizontal forward to aft axis to show a pair of removable cantilevered foot pedals connected on opposite sides of the vertical steering shaft;

Figure 6 is a cross sectional view of the connection of the pair of removable cantilevered foot pedals to the vertical steering shaft;

Figure 7 is a side view canted around a horizontal forward to aft axis to show a telescoped vertical steering shaft in a length suitable for a standing rider;

Figure 8 is a side view canted around a horizontal forward to aft axis to show the removable seat extension including its first end and the receiver means;

Figure 9 is a side view canted around a horizontal forward to aft axis to show the removable seat extension with its first end installed in the receiver means;

Figure 10 is a side view canted around a horizontal forward to aft axis to show a pair of removable cantilevered foot pedals connected on opposite sides of the telescoped vertical steering shaft;

Figure 11 is a front trimetric view showing the first end of the removable upper vertical steering shaft support means is slidably connected to the upper surface of the first end of the frame;

Figure 12 is a front trimetric view showing the first end of the removable upper vertical steering shaft support means prior to being slidably connected to the upper surface of the first end of the frame;

Figure 13 is a side view of the steerable skateboard canted around a horizontal forward to aft axis to show the foot steering means attached to the remaining portion of the vertical steering shaft;

Figure 14 is a side view canted around a horizontal forward to aft axis to show the sidewalk ski board configuration;

Figure 15 is a side view canted around a horizontal forward to aft axis to show snow ski board configuration;

Figure 16 is a trimetric view of the steering ski attached at the second end of the vertical steering shaft;

Figure 17 is a side view of the steerable skateboard canted around a horizontal forward to aft axis to show the foot steering means attached to the remaining portion of the vertical steering shaft and the removable seat extension with its first end installed in the receiver means;

Figure 18 is a side view of the steerable skateboard canted around a horizontal forward to aft axis to show the foot steering means attached to the remaining portion of the vertical steering shaft, the removable seat extension with its first end installed in the receiver means and rubber tipped ski poles;

Figure 19 is a side view canted around a horizontal forward to aft axis, to show the snow ski board configuration, the removable seat extension with its first end installed in the receiver means and rubber tipped ski poles.

DETAILED DESCRIPTION OF THE INVENTION

As illustrated in **figures 1**, **2** and **3**, the invention is a rider-propelled wheeled vehicle called a twist scooter **10**. The twist scooter **10** includes a frame **14**. The frame **14** has a first end **18**, a second end **22**, a first side, a second side, an upper surface **26**, a lower surface **30** and a vertical centerline plane running lengthwise.

A pair of wheel supports **34** is provided. Both wheel supports **34** are attached to and supporting the second end **22** of the frame **14**. A wheel **38** is mounted onto a horizontal axle attached to each individual wheel support **34**. Each wheel support **34** is spaced at equal distances on opposite sides of the centerline plane of the frame **14**.

A safety bumper means **42** is provided. The safety bumper means **42** is attached to the lower surface of the second end of the frame **14,** aft of the wheel supports **34**. The safety bumper means **42** is located such that the centerline plane of the frame **14** bisects it. The safety bumper means **42** is sized and shaped to prevent excessive backward tipping of the vehicle on the wheels attached to the wheel supports **34**, but also allow a full range of horizontal movement. The safety bumper means **42** is capable of functioning as a braking device. A braking force is created when the vehicle is intentionally tipped backwards to bring the safety bumper means **42** into frictional contact with the ground

A vertical steering shaft **46** is provided. The vertical steering shaft **46** has a first end **50**, a second end **54,** and a vertical centerline axis. The vertical steering shaft **46** is rotatably connected **52** through the first end **18** of the frame **14**. The rotatable connection

52 permits a 360-degree swivel of the vertical steering shaft **46**. The vertical steering shaft **46** is vertically disposed. The centerline axis of the vertical steering shaft **46** lies within the centerline plane of the frame **14**.

A tricycle propulsion means **58** is provided. The tricycle propulsion means **58** possesses a propulsion wheel **62** disposed at each of the two corners and a safety wheel assembly **66** disposed at the third corner of the tricycle wheel arrangement. The two propulsion wheels **62** and the safety wheel assembly **66** are attached to the vertical steering shaft **46** by a horizontal support **70**. Each propulsion wheel **62** is parallel to the other propulsion wheel **62**. The pair of propulsion wheels **62** rotates about a horizontally disposed axle **74**. The horizontally disposed axle **74** is connected to the horizontal support **70**. The safety wheel assembly **66** is sized, shaped and disposed so that it only comes into contact with the ground when the tricycle propulsion means **58** excessively tips over on both the propulsion wheels **62**. The tricycle propulsion means **58** and vertical steering shaft **46** combination supports the first end of the frame **14**. The pair of propulsion wheels **62** is spaced at equal distances on opposite sides of vertical steering shaft **46**. The propulsion wheels **62** rotate in only one direction about its horizontal axle **74**. The pair of propulsion wheels **62** rotate only in the same direction about their respective horizontal axle **74**.

A rider operable steering means **78** is provided. The rider operable steering means **78** is attached to the second end **54** of the vertical steering shaft **46**. A standing or sitting rider is able to propel and steer the vehicle using only hand-applied force to the rider operable steering means **78**. The hand applied force results in rotation of the vertical steering shaft **46**.

The tricycle propulsion means **58** is adapted to occupy a first neutral position in which the vertical plane of each propulsion wheel **62** is generally parallel to the centerline plane of the frame **14**. The first neutral position permits forward propulsion of the vehicle in a direction parallel to the centerline plane of the frame **14**.

The rider operable steering means **78** is employed by the rider to rotate the tricycle propulsion means **58**. When the tricycle propulsion means **58** is rotated, a reversing force is exerted upon one of the propulsion wheels **62** resulting in the tricycle propulsion means **58** pivoting about the point of contact of the propulsion wheel **62** with the ground. The pivoting of the tricycle propulsion means **58** induces a forward motivating force to be applied to the other propulsion wheel **62**. The motivated propulsion wheel **62** rotates forward until the rider reverses the rotation of the tricycle propulsion means **58** about the vertical steering shaft **46** axis or the vertical plane of the propulsion wheel **62** is perpendicular to the centerline plane of the frame **14**. A reverse direction rotation about the vertical steering shaft **46** reverses the direction of the force applied to each propulsion wheel **62** but still results in forward propulsion of the vehicle. The back and forth rotation about the vertical centerline axis of the vertical steering shaft **46** propels the vehicle forward. The safety wheel assembly **66** imparts no propulsion force into the vehicle during the back and forth rotation about the vertical centerline axis of the vertical steering shaft **46** that propels the vehicle forward. This back and forth manipulation of the steering mechanism results in"walking" propulsion of the vehicle.

The tricycle propulsion means **58** is tailored to occupy second neutral position 180 degrees opposite the first neutral position. When in the second neutral position, the vertical plane of each propulsion wheel **62** is generally parallel to the centerline plane of

the frame **14**. The second neutral position permits backward propulsion of the vehicle in a direction parallel to the centerline plane of the frame **14**. The back and forth rotation of the tricycle propulsion means **58** about the vertical steering shaft **46** of up to plus or minus 90 degrees from the second neutral position imparts a generally backward propulsion of the vehicle through a process that is the reverse of the forward propulsion process.

In a second version of the invention, a wheel **82** in contact with the ground only when the tricycle propulsion means **58** excessively tips over on both the propulsion wheels **62,** is rotationally connected to the safety wheel assembly **66**. The safety wheel assembly **66** possesses a means for permitting rotation of the wheel **82** about a vertical axis. The safety wheel assembly **66** possesses a means for permitting rotation of the wheel **82** about a horizontal axle.

As illustrated in **figures 1**, **2**, **3**, **11**, and **12**, a removable upper vertical steering shaft support means **86** is provided. The removable upper vertical steering shaft support means **86** possesses a first end **90** and a second end **94**. The first end **90** is able to detachably connect to the upper surface **26** of the first end **18** of the frame **14**. The second end **94** is rotationally attached to the vertical steering shaft **46**.

In a different version of the invention, the tricycle propulsion means **58** is detachably connected to the vertical steering shaft **46**.

As illustrated in **figure 7**and **10**, the vertical steering shaft **46** possesses a vertical telescoping extension capability that changes the distance between the first end **50** and the second end **54** of the vertical steering shaft **46**. The vertical steering shaft **46** is composed an outside shaft **98** with a first end, a second end **100** an outer surface, and a

hollow interior and a plurality of concentrically ensleeved inside shafts **102,** each capable of being ensleeved by its corresponding outside shaft **98** to make the vertical steering shaft **46** telescopic. A locking means **106** is affixed to the second end **100** of each outside shaft **98** and provides a locking means **106** against each corresponding ensleeved inside shaft **102**. Each inside shaft **102** is capable of being locked into a user determined telescopic extension length.

In still a different version of the invention, the second end of the frame **14** accommodates a standing or a seated rider.

As shown in **figures 8, 9, 10, 17, 18** and **19**, the removable seat extension **110** is provided. The removable seat extension **110** possesses a first end **114** and a second end **118**. The first end **114** is shaped to slideably attach to a receiver means **122** located on the upper surface **26** of the second end **22** of the frame **14**. The second end **118** of the removable seat extension **110** is shaped to comfortably accommodate a seated rider.

In another novel version of the invention, the rider operable steering means **78** permits the rider to steer or propel the vehicle using the rider's feet. The rider operable steering means **78** is adapted so that a sitting rider is able to propel and steer the vehicle using only foot applied force to the rider operable steering means **78**. The foot applied force results in rotation of the vertical steering shaft **46**.

As illustrated in **figure 4**, a pair of foot stirrups **126** is connected to the rider operable steering means **78**. A foot stirrup **126** is connected on opposite sides of the rider operable steering means **78**.

As shown in **figures 5, 6** and **10**, a pair of removable cantilevered foot pedals **130** is connected on opposite sides of the vertical steering shaft **46**. A rider's foot force is

applied to each removable cantilevered foot pedal **130** to impart a back and forth rotation about the vertical centerline axis of the vertical steering shaft **46** required to propel the vehicle forward.

As illustrated in **figure 13, 14, 15, 17, 18** and **19,** a foot steering means **134** is provided. The vertical steering shaft **46** has a separation joint located above the rotatable connection through the first end of the frame. The foot steering means **134** is attached to the remaining portion of the vertical steering shaft **46** when the separation joint is disconnected, and the portion the vertical steering shaft **46** above the separation joint is removed. The portion of the vertical steering shaft **46** located above the rotatable connection through the first end of the frame **14** is removed. The foot steering means **134** is attached to the remaining portion of the vertical steering shaft **46**. The foot steering means **134** attaches to the rider's footwear through the use of snowboard type bindings. A standing rider's foot through a slight back and forth rotation about the vertical centerline axis of the vertical steering shaft **46** imparts steering changes.

As shown in **figures 14 , 15** and **17**, an aft foot holder **138** is provided. The aft foot holder **138** is attached to the upper surface **26** of the frame **14** near its second end **22**. The aft foot holder **138** attaches to the rider's footwear through the use of snowboard type bindings. The rider pushes along with rubber tipped ski poles **142** to generate vehicle propulsion.

As illustrated in **figures 15, 16** and **19**, the pair of fixed wheel supports **34** is removed from the frame. The tricycle propulsion means **58** is replaced by a steering ski **152** attached to the first end **50** of the vertical steering shaft **46**. The safety bumper means **42** is also removed from the frame **14**. These changes transform the vehicle into a

steerable snowboard **156** capable of use on snow. Typical ski poles **146** are used for added rider control.